

***PSYDROTHRIPS LUTEOLUS*, NEW SPECIES, FROM HAWAII AND
NOTES ON *P. KEWI* (THYSANOPTERA: THRIPIDAE)**

SUEO NAKAHARA AND DICK TSUDA

(SN) Systematic Entomology Laboratory, PSI, Agricultural Research Service, USDA, 10300 Baltimore Avenue, Beltsville, Maryland 20705-2350; (DT) Department of Entomology, University of Hawaii at Manoa, Honolulu, Hawaii 96822.

Abstract.—*Psydrotrips luteolus*, new species, damages *Dieffenbachia* sp. and other Araceae in Hawaii. The adult female and male and second-instar larva are described and illustrated. Additional descriptions are provided for *P. kewi* Palmer and Mound, the type species of the genus, and its origin is discussed.

Key Words: *Psydrotrips*, *luteolus*, *kewi*, adults, larva, *Dieffenbachia*, Araceae, Hawaii

Psydrotrips kewi Palmer and Mound (1985), the type species of a monotypic genus, was first noticed in 1982 when it severely damaged leaves of *Philodendron* spp. in a glasshouse at Kew, England. The infested philodendrons were imported from Brazil, Mexico and Trinidad indicating that *P. kewi* is of neotropical origin. However, a collection record of *P. kewi* from the Neotropics was not available until recently. While examining unidentified material of another genus in the USNM Thysanoptera Collection in 1992, a specimen of *P. kewi* was discovered by the senior author. This specimen was intercepted on philodendron canes from Tamazunchale, San Luis Potosi, Mexico at agricultural quarantine in 1952 at Laredo, Texas. Thus, the infestation in Kew may have been introduced on philodendrons imported from Mexico, and it may not occur in Brazil or Trinidad.

The second *Psydrotrips* taxon, *luteolus*, new species, was discovered in Honolulu, Hawaii, in July of 1991 on *Dieffenbachia* sp. and was subsequently found on other araceous hosts in several localities in the city. It damages the young leaves of these hosts. The feeding damage and habits of the

immature instars and adults were observed by the junior author and are discussed under "Habits."

Measurements are in microns except for body length which is in millimeters. Measurements of holotype are given first followed by those of the female paratypes in parentheses () unless otherwise indicated. USNM is an acronym for the United States National Museum of Natural History, Washington, D.C.

***Psydrotrips luteolus*, NEW SPECIES**

Female (macroptera).—Head (Fig. 1) pale yellow with eyes grayish brown except ommatidia colorless, small grayish brown area extending posteriorly from eye between positions of POiii and POiv setae (Fig. 1, C); ocellar crescent red; pronotum yellow with a posterolateral light grayish brown area on each side (Fig. 2, C); pterothorax pale yellow with preepisternum brown; legs yellow; setae light brown or yellow; forewing grayish brown, paler distally, a subbasal pale area posterior to forevein, scale completely grayish brown; hindwing with median longitudinal grayish brown stripe, scale grayish brown. Antennal segments I and II light yellow.

low, III yellow with distal part grayish brown, IV yellow on basal $\frac{2}{3}$, grayish brown on distal $\frac{1}{3}$, V yellow on basal $\frac{1}{2}$, grayish brown on distal $\frac{1}{2}$, VI grayish brown with yellowish brown or yellow area distal to grayish brown base, VII–IX grayish brown.

Antenna (Fig. 3): Segments III–IX elongate; III constricted at base, with irregular inner and outer margins, 3.35 to 3.75 times as long as wide (Fig. 3, A); segments V and VI subequal in length; III and IV with U-shaped trichomes, 30 (30–37) long, inner sense cone on VI 54 (54) long (Fig. 3, B), extending to distal $\frac{1}{4}$ of VIII.

Head (Fig. 1): Wider than long, slightly produced anterior to eyes, apex of vertex between base of antennae rather wide, interantennal process truncate, $\frac{3}{4}$ to $\frac{4}{5}$ as wide as antennal segment I. Eyes slightly longer than occiput, interocular distance about 1.5 times wider than width of eye. Cheeks slightly converging posteriorly, either straight or slightly concave. Occiput with transverse anastomosing sculpture. Fore ocellus almost aligned with anterior margin of eyes, 17–22 wide; hind ocelli separated by 1.5 to 2.0 times the diameter of fore ocellus. Ocellar setae I short, anterior of fore ocellus; ocellar setae II short, anterolaterad of fore ocellus and near mesal margin of eyes; ocellar setae III well developed, laterad of fore ocellus (Fig. 1, A). Four pairs of postocular setae (PO), POi–iii setae subequal in length (Fig. 1, B), aligned longitudinally, POiv shorter and laterad to POiii. Mouthcone broadly conical, rounded apically, extending between prothoracic coxae.

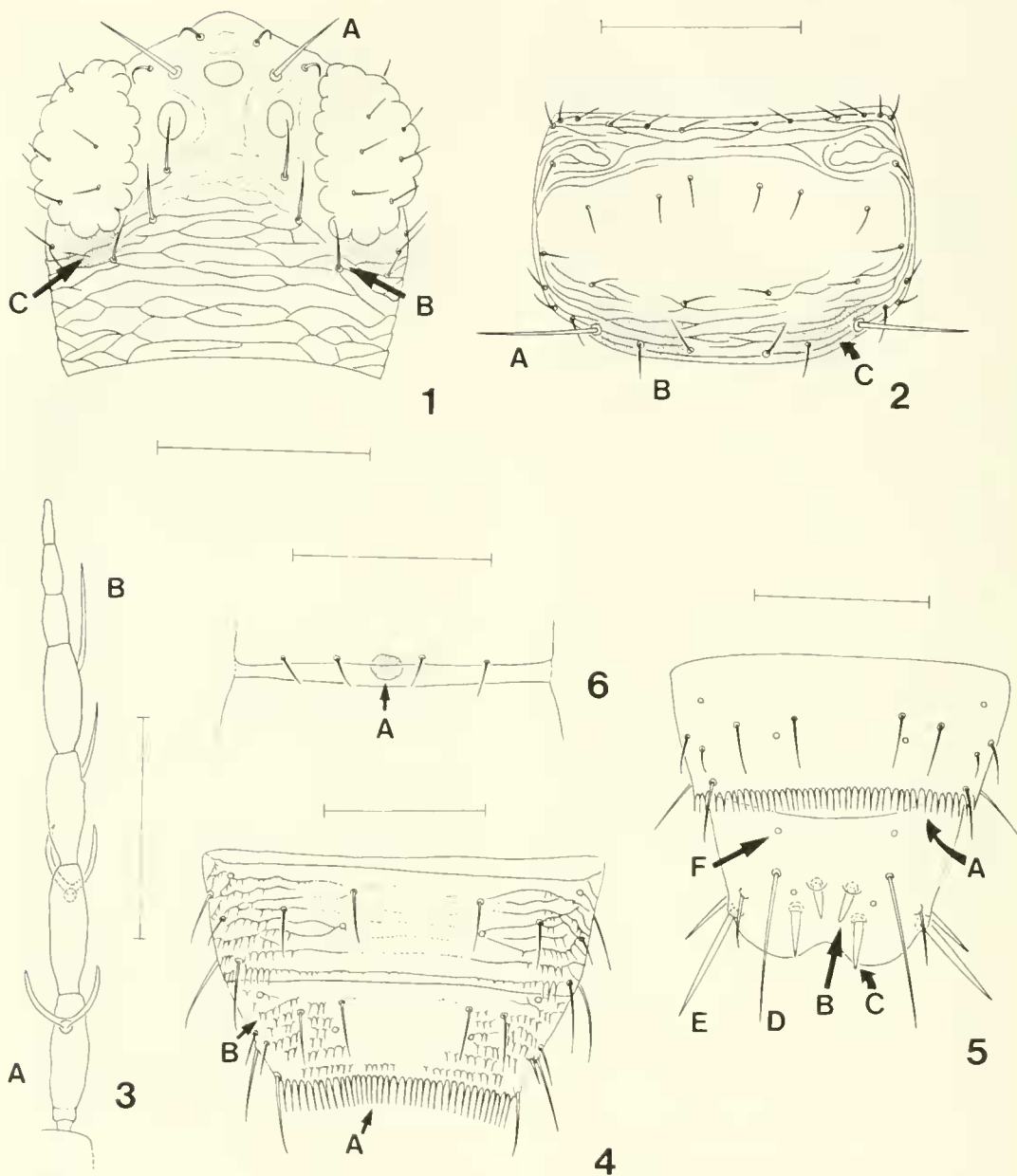
Pronotum (Fig. 2): Wider than long, shorter than head, weakly sculptured; normally with a short, irregular longitudinal median line on disc. Discal setae short, 35 (28–35) present; 1 pair of posteroangular setae developed, $\frac{2}{5}$ to $\frac{3}{5}$ as long as notum, usually between $\frac{1}{2}$ to $\frac{3}{5}$ as long (Fig. 2, A); posteromarginal setae 2 pairs, median pair longest (Fig. 2, B). Ferna complete, with 1 pair of short setae. Mesonotum: Transverse, anastomosing sculpture medially, anterior

part without sculpturing and posterior part weakly sculptured; anteromedial sensilla absent; submedial setae short, far anterior to posterior margin. Mesothoracic sternal furca with poorly developed spinula. Metanotum: Completely reticulated polygonally; median setae posterior of anterior margin; other sensilla absent. Metathoracic sternal furca with well developed spinula; intercoxal process with subtruncate apex.

Forewing: Straight, pointed at apex; 26–28 (25–28) costal setae, those at midlength shorter than width of wing; 24–26 (21–28) straight, anterior fringe cilia; posterior fringe cilia wavy; forevein with 9 (8–10) setae in proximal $\frac{1}{2}$, 3 setae in distal $\frac{1}{2}$, hindvein with 11 (9–14) setae; scale with usually 5 (4–6) marginal setae and 1 discal seta.

Abdomen: Median setae on tergites far apart, reduced on tergite I, gradually longer posteriorly, well developed on tergite VIII, separated by at least twice its length; tergite II with 3 lateral setae. Sculpture lines absent from median area on tergites I–V, present medially on VI–VIII; numerous microtrichia on sculpture lines and on posterior margins on lateral $\frac{1}{4}$ to $\frac{1}{3}$ of tergites I–VII (Fig. 4, B), anterior and mesal ones short, longer laterally and posteriorly. Posteromarginal comb on VIII complete, with 38 (37–50) close-set microtrichia, longest 20–24 (Fig. 4, A). Tergite IX longer than X, with 2 pairs of sensilla; B1–B3 setae longer than tergite X; tergite X without dorsal split. Pleurotergites without accessory setae, with microtrichia on sculpture lines, and microtrichia or teeth on posterior margin; pleurosternite with microtrichia on sculpture lines, and teeth on posterior margin. Sternites II–VII with accessory setae in irregular row; anteromedial setae absent from sternite I; sternites II–VII with 3 pairs of posteromarginal setae, median pair on sternite VII on posterior margin.

Male (macroptera).—Similar to female in color and most morphological characters, but smaller. Abdominal tergite VIII with well developed, complete posteromarginal



Figs. 1-6. *Psydrotshrips luteolus* (scale for figures = 0.1 mm). 1, Female head: A) ocellar setae III; B) POiii seta; C) brown area. 2, Female pronotum: A) posteroangular seta; B) posteromarginal seta; C) grayish brown area. 3, Female antenna: A) segment III; B) sense cone on segment VI. 4, Female abdominal tergites VII and VIII: A) posteromarginal comb; B) microtrichia. 5, Male abdominal tergites IX and X: A) posteromarginal comb; B) B1 seta; C) B2 seta; D) dorsal seta; E) posterolateral seta; F) sensillum. 6, Male abdominal sternites II and III: A) glandular area.

comb (Fig. 5, A). Tergite IX with median notch on posterior margin; B1 and B2 setae short, stout, spinelike (Fig. 5, B and C); B1 setae anterior and closer to each other than

B2 setae; dorsal setae bristlelike, laterad of B1 setae (Fig. 5, D); posterolateral setae stout (Fig. 5, E), a thick, shorter seta just anterior of posterolateral seta; single bristlelike setae

anterior to posterolateral setae; a sensillum anterior or anterolaterad of each B2 seta, another pair between D1 setae and anterior margin (Fig. 5, F). Sternites II–VIII with accessory setae in single row; median, oval gland in intersegmental membrane between sternites II and III, 24 long, 27 wide (Fig. 6, A).

Measurements of holotype and female paratypes: Body length 1.57 (1.48–1.59) mm (distended). Antenna: Total length: 337 (323–355); length and width of segment I 24 (22–24), 33 (32–35); II 37 (35–42), 30 (30); III 62 (57–64), 17 (17); IV 54 (52–59), 17 (17–20); V 47 (44–52), 17 (17–18); VI 47 (44–52), 17 (17–18); VII 22 (20–22), 12 (12–13); VIII 22 (22), 10 (10); IX 22 (22–23), 6 (5–7).

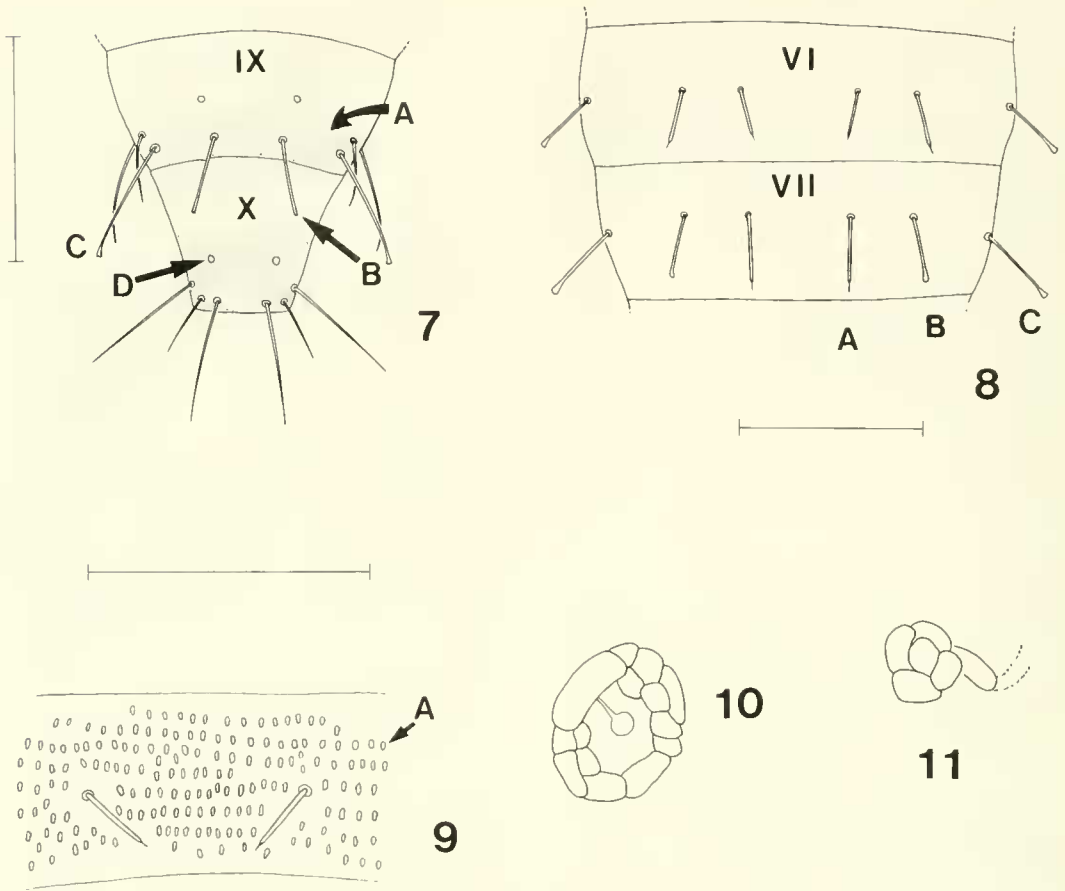
Length of head from interantennal process 165 (158–165), from anterior of eyes 141 (136–157), width at eyes 188 (185–195), at cheeks 173 (178–188). Pronotum 121 (103–128) long, 285 (190–203) wide. Forewing 728–770 (701–839) long, 47 (47–57) wide at midlength. Abdominal tergite IX 86 (86–100) long, tergite X 74 (74–79) long. Length of setae: Ocellar setae I (17–22), setae II (22–24), setae III 37 (40–54); POi setae 32 (32), POii 27 (30–32), POiii 24 (24–30), POiv 12 (15–17); pronotal posteroangular setae 54–59 (50–64); median postero-marginal setae 22 (24–30); metanotal median setae 22–24 (24–27); median setae on abdominal tergite VIII 37 (37–44); B1 setae on tergite IX 101 (101–111), B2 setae 114 (114–121), B3 setae 121 (109–117); B1 setae on tergite X 109 (99–111), B2 setae 99 (96–109).

Measurements of male paratype: Body 1.27 mm long (distended). Antenna: Total length 290; length and width () of segment I 22 (30), II 35 (27), III 52 (17), IV 44 (17), V 40 (17), VI 40 (17), VII 17 (12), VIII 20 (10), IX 20 (7). Length of head from interantennal process 124, from anterior of eyes 121, width at eyes 161, at cheeks 148. Pronotum 99 long, 173 wide. Forewing 644 long, 44 wide at midlength. Pronotal posteroangular setae 44–50 long, median pos-

teromarginal setae 20 long; on tergite IX D1 setae 82–89 long, B1 setae 22 long, 6 wide, B2 setae 30–32 long, 5 wide; long posterolateral setae 64 long, 6 wide, shorter posterolateral setae 40 long, 3 to 4 wide; bristlelike setae anterior of posterolateral seta 37–42 long; midlateral seta 50 long.

Second-instar larva: Body white with light reddish internal pigment, eye with red pigment. Antennal segment I light grayish yellow on basal $\frac{1}{3}$, membranous, white distally; II light grayish yellow, apically membranous, white; III gray, basally and apically membranous, white; IV–VII gray with intersegmental parts membranous, white. Anteromedial gray band extending dorsoventrally between antennal bases. Tarsi, tibiae and base of femora gray. Abdominal tergite IX with grayish yellow band extending from posterior margin to between dorsal setae and sensilla (Fig. 7, A); tergite X grayish yellow to anterior of sensilla (Fig. 7, D).

Antennal segment IV with microtrichia on annulations, other segments lack microtrichia; segment VII 1.5 to 2.0 times longer than segment VI; outer sense cone on VI longer than segment VII. Head with long D2 seta, D1 and D2 setae pointed apically, D3 blunt apically, D4 expanded apically, D5 short, pointed apically. Pronotum with dorsal setae pointed except apex of D6 expanded or blunt. Legs with 1 long expanded seta on tarsi, fore- and hindtibiae each with 4 dorsal setae with expanded apices, midtibia with 5 dorsal setae with expanded apices, femora each with 4 expanded setae, coxae each with 1 seta with expanded apex. Abdominal tergites I–VI with D1 and D2 setae normally slightly expanded apically with a point and D3 setae on III–VI with expanded apices (Fig. 8, A, B and C); tergites VII and VIII with D1 setae normally slightly expanded apically with a point and D2 setae with expanded apices (Fig. 8, A and B), D3 setae on VII with expanded apices (Fig. 8, C) and those on VIII with pointed apices; IX with D1 setae normally blunt apically (Fig. 7, B), D2 setae expanded apically (Fig. 7, C); dorsal setae on tergite X slender, bris-



Figs. 7-11. Second-instar larva of *Psydrothrips luteolus* (scale for figures = 0.1 mm). 7, Abdominal tergites IX and X: A) sclerotized band; B) D1 seta; C) D2 seta; D) sensilla. 8, Abdominal tergites VI and VII: A) D1 seta; B) D2 seta; C) D3 seta. 9, Abdominal tergite V: A) plaques. 10, Mesothoracic spiracle. 11, Spiracle on abdominal segment VIII.

tlelike; ventral setae slender and tapered apically. Abdominal tergite IX without posteromarginal teeth, sensilla slightly farther apart than distance between D1 setae (Fig. 7). Mesothoracic spiracle with 1 row or with partial second row of cells around orifice (Fig. 10); abdominal spiracle on segment II small, circular, with 3 cells, spiracle on segment VIII slightly larger, with 4-5 cells (Fig. 11). Plaques oval, without microtrichia, at most with a mere point, in about 8 rows on tergite V (Fig. 9), those on sternite about same size as dorsal ones, in fused spinulose sections of varying widths on tergite IX.

Material examined: Holotype female, 11

female and 3 male paratypes; Hawaii, Oahu, Aiea Hts., unfurled leaf of *Dieffenbachia* sp., 13-V-92, W. Nayamine. Hawaii, Oahu, Honolulu: St. Louis Hts., 1 female and 1 male paratypes, unfurled leaves of *Dieffenbachia* sp., 1-VII-91, M. Nakamoto; Manoa Valley, 3 female and 4 male paratypes, unfurled leaf of wild *Epipremnum pinnatum* (L.) Engl., 9-I-92, D. M. Tsuda; University of Hawaii Campus, 6 female and 1 male paratypes, 10 larvae, *Epipremnum pinnatum*, 2 female paratypes, *Syngonium podophyllum* Schott., 1 female paratype, *Philodendron* sp., 8-V-92, D. M. Tsuda. Holotype and paratypes deposited in USNM; paratypes deposited in

Bishop Museum, Honolulu, Hawaii; California Dept. of Food and Agriculture, Sacramento; Florida State Collection of Arthropods, Gainesville; The Natural History Museum, London, United Kingdom; and Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany.

Hosts: *Dieffenbachia* sp., *Epipremnum pinnatum* (L.) Engl., *Philodendron* sp., and *Syngonium podophyllum* Schott.

Etymology: Specific epithet, Latin "luteolus" (yellowish), characterizes the predominantly yellow body of this species.

Habits: This cryptic, fast moving thrips attacks young emerging leaves. Feeding damage is quite obvious. An infested terminal (young unfurled leaf) becomes stunted and malformed, with the outer surface blackened. Larvae and adults hide and feed within the narrow space between the base of the leaf stem (younger leaves) and trunk (vine), and more commonly between the loose layers of the young unfurled leaves. The mature larvae and pupae hide in the leaf axils of older leaves.

Comments: *Psydrotrips luteolus* adults differ from *P. kewi* by yellow antennal segments I-II, almost completely yellow head, and longer pronotal posteroangular setae, 59-64 long. Conversely, *P. kewi* has brown antennal segments I-II, head yellow medially and brown anteriorly and submarginally through the eyes to the posterior margin, and shorter pronotal posteroangular setae shorter, 35-50 long.

The distribution of apically pointed and expanded dorsal setae, absence of postero-marginal teeth from abdominal tergite IX, sclerotization on tergites IX and X, and absence of microtrichia from antennal segment III distinguish the second-instar larva of *P. luteolus* from those of other thrips species in Hawaii.

Although the origin of *P. luteolus* is unknown, it apparently was introduced from

the Neotropics because it closely resembles *P. kewi* and has similar host preferences.

Psydrotrips kewi Palmer and Mound

The following morphological and color characters were not discussed in the original description of *P. kewi* and are amended here to provide a more accurate concept of the species: Antennal segments I and II brown with apex of II yellow, III yellow with distal part grayish brown, basal 1/2 of IV yellow and distal 1/2 brown, basal 1/3 of V yellow and rest brown, VI-IX brown. Forewing uniformly brown with a subbasal pale area present; scale completely brown. Pronotal posteroangular setae 35-50 long; postero-marginal setae 3 pairs, occasionally total of 5 setae present. Mesonotum sculptured medially and posteriorly, unsculptured anteriorly; anteromedial sensilla absent. Abdominal tergite II with 3 lateral setae on each side; abdominal sternite I without anteromedial setae, sternite II with 3 pairs of setae on posterior margin.

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